

In the Claims:

1. (Canceled).
2. (Currently Amended) A phase changeable memory cell, comprising:
a substrate;
a bottom electrode on the substrate;
a phase changeable material layer pattern on the bottom electrode; and
a top electrode on the phase changeable material layer pattern, the top electrode having a tip that extends toward the bottom electrode, wherein the bottom electrode has a planar portion and a vertical portion, and wherein the tip of the top electrode has a center along a length and width that is aligned with a center of a facing surface of the vertical portion of the bottom electrode, and wherein the tip of the top electrode forms a sharp point that is substantially more narrow than the facing surface of the vertical portion of the bottom electrode.
3. (Previously Presented) The phase changeable memory cell of claim 2, wherein the bottom electrode is cylindrical, and the vertical portion of the bottom electrode extends from an edge of the planar portion of the bottom electrode.
4. (Previously Presented) The phase changeable memory cell of claim 2, wherein the phase changeable material layer pattern is directly on the bottom electrode.
5. (Previously Presented) The phase changeable memory cell of claim 2, further comprising:
a lower interlayer insulating layer between the bottom electrode and the substrate; and
a contact plug extending through the lower interlayer insulating layer and electrically connecting the substrate with the bottom electrode.

6. (Currently Amended) A phase changeable memory cell, comprising:

a substrate;

a bottom electrode on the substrate, the bottom electrode having a planar portion and a vertical portion;

a middle interlayer insulating layer on the substrate and the bottom electrode, the middle interlayer insulating layer defining a contact hole that exposes at least a part of the vertical portion of the bottom electrode;

a phase changeable material layer pattern in the contact hole, the phase changeable material layer pattern having a sidewall portion that extends out of the contact hole and across a portion of the middle interlayer insulating layer; and

a top electrode on the phase changeable material layer pattern, the top electrode having a tip that extends toward the vertical portion of the bottom electrode, wherein the tip of the top electrode has a center along a length and width that is aligned with a center of a facing surface of the vertical portion of the bottom electrode, and wherein the tip of the top electrode forms a sharp point that is substantially more narrow than the facing surface of the vertical portion of the bottom electrode.

7. (Original) The phase changeable memory cell of claim 6, further comprising a spacer pattern between a sidewall of the contact hole and the phase changeable material layer pattern in the contact hole.

8. (Original) The phase changeable memory cell of claim 6, wherein the bottom electrode is cylindrical, and the vertical portion of the bottom electrode extends from an edge of the planar portion of the bottom electrode, and further comprising a mold layer on the planar portion of the bottom electrode and adjacent to the vertical portion of the bottom electrode, and wherein the middle interlayer insulating layer covers the mold layer, and the contact hole exposes the mold layer adjacent to the exposed vertical portion of the bottom electrode.

9. (Original) The phase changeable memory cell of claim 6, further comprising:

a lower interlayer insulating layer between the bottom electrode and the substrate; and

a contact plug extending through the lower interlayer insulating layer to electrically connect the bottom electrode with the substrate.

10. (Original) The phase changeable memory cell of claim 6, further comprising an etch stop layer between the bottom electrode and the middle interlayer insulating layer.

11. (Original) The phase changeable memory cell of claim 6, further comprising a shield layer that covers a sidewall of the phase changeable material layer pattern.

12. (Original) The phase changeable memory cell of claim 6, further comprising a plate electrode on the top electrode, wherein the plate electrode is electrically connected to the top electrode.

13. (Currently Amended) A phase changeable memory cell, comprising:
a substrate;

a bottom electrode on the substrate, the bottom electrode having a planar portion and a vertical portion;

a middle interlayer insulating layer on the substrate and the bottom electrode, the middle interlayer insulating layer defining a contact hole that exposes at least a part of the vertical portion of the bottom electrode;

a phase changeable material layer pattern in the contact hole; and
a top electrode on the phase changeable material layer pattern, the top electrode having a tip that extends toward the vertical portion of the bottom electrode, wherein the tip of the top electrode has a center along a length and width that is

aligned with a center of a facing surface of the vertical portion of the bottom electrode, and wherein the tip of the top electrode forms a sharp point that is substantially more narrow than the facing surface of the vertical portion of the bottom electrode.

14. (Original) The phase changeable memory cell of claim 13, further comprising a spacer pattern between a sidewall of the contact hole and the phase changeable material layer pattern in the contact hole.

15. (Original) The phase changeable memory cell of claim 13, wherein the phase changeable material layer pattern is directly on the vertical portion of the bottom electrode.

16. (Original) The phase changeable memory cell of claim 13, wherein the vertical portion of the bottom electrode extends from an edge of the planar portion of the bottom electrode, and further comprising a mold layer on the planar portion of the bottom electrode and adjacent to the vertical portion of the bottom electrode, and wherein the middle interlayer insulating layer covers the mold layer and the contact hole exposes the mold layer adjacent to the exposed vertical portion of the bottom electrode.

17. (Original) The phase changeable memory cell of claim 13, further comprising:

a lower interlayer insulating layer between the bottom electrode and the substrate; and

a contact plug extending through the lower interlayer insulating layer to electrically connect the bottom electrode with the substrate.

18. (Original) The phase changeable memory cell of claim 13, further comprising an etch stop layer between the bottom electrode and the middle interlayer insulating layer.

19. (Original) The phase changeable memory cell of claim 13 further comprising a plate electrode on the top electrode, wherein the plate electrode is electrically connected to the top electrode.

20. (Canceled).

21. (Canceled).

22. (Currently Amended) A method of fabricating a phase changeable memory cell, the method comprising:

providing a substrate;
forming a bottom electrode on the substrate;
forming a phase changeable material layer on the bottom electrode; and
forming a top electrode on the phase changeable material layer, the top electrode having a tip that extends toward the bottom electrode, wherein forming a bottom electrode comprises forming the bottom electrode with a planar portion and a vertical portion, and wherein forming a top electrode comprises forming the top electrode so that the tip extends toward the vertical portion of the bottom electrode and has a center along a length and width that is aligned with a center of a facing surface of the vertical portion of the bottom electrode, and wherein forming a top electrode comprises forming the top electrode so that the tip of the top electrode forms a sharp point that is substantially more narrow than the facing surface of the vertical portion of the bottom electrode.

23. (Previously Presented) The method of claim 22, further comprising:

forming a middle interlayer insulating layer on the bottom electrode, wherein the middle interlayer insulating layer defines a contact hole that exposes a part of the vertical portion of the bottom electrode, and wherein forming a phase changeable material layer on the bottom electrode comprises forming the phase change material layer in the contact hole and having a dented portion that extends toward the vertical portion of the bottom electrode, and wherein forming a top electrode on the phase changeable material layer comprises forming a conductive layer on the phase changeable material layer including in the dented portion of the phase changeable material layer.

24-37. (Canceled).

38. (Currently Amended) The phase changeable memory cell of claim 2, wherein a center of the top electrode is substantially aligned with the center of the facing surface of the vertical portion of the bottom electrode.

39. (Canceled).

40. (Currently Amended) The phase changeable memory cell of claim 6, wherein a center of the top electrode is substantially aligned with the center of the facing surface of the vertical portion of the bottom electrode.

41. (Canceled).

42. (Currently Amended) The phase changeable memory cell of claim 13, wherein a center of the top electrode is substantially aligned with the center of the facing surface of the vertical portion of the bottom electrode.

43. (Canceled).

44. (Currently Amended) The method of claim 22, wherein forming a top electrode comprising forming the top electrode so that its center is substantially aligned with the center of the facing surface of the vertical portion of the bottom electrode.